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and in the reproduction of affective states. These may reproduce themselves spontaneously or we may voluntarily call them up. The former occurrence is the more common, the latter indeed being entirely unanalyzable by many persons.

The issue of the discussion, interesting as a Ribot theory, not as Külpe's interpretation of his own data, is apparently that we probably may add the affective as a memory type comparable in its specialized appearance in certain individuals to that of the motor or the visual in others. Whether we may speak in any intelligible sense of feeling imagery as we may of feeling recall the author does not discuss.

CHAS. HUGHES JOHNSTON.

UNIVERSITY OF MICHIGAN.

Studies from the Psychological Laboratory of the University of Illinois. Vol. I., No. 1. STEPHEN S. COLVIN. Baltimore, Md.: The Review Publishing Co.

Two studies in animal psychology and three in the psychology of learning from the University of Illinois constitute the psychological monograph published by the *Psychological Review* in November, 1909. The volume is edited by Stephen S. Colvin, who also shares in the authorship of two of the studies—on the color perception of three dogs, a cat, and a squirrel, with C. C. Burford, and on the development of imagination in school children and the relation between ideational types and the retentivity of material appealing to various sense departments, with E. J. Myers.

The work with the animals differed from the well-known experiments of Professor Thorndike, in that the animals were kept as nearly normal and allowed as much freedom as possible. Colored paper was pasted on receptacles containing food that was accessible, paper of different colors on other boxes and pans into which the animals could not enter; certain colors were thus associated with satisfaction and other colors with failure. It was found that the animals could not only discriminate one color from another, though with considerable individual differences, but were able finally to "abstract" the colors, so that orange, for example, would be picked out by a dog immediately in whatever location or circumstances it might appear. Violet and green seemed to have less power, on the whole, of impressing these animals' minds than orange and blue.

The other study by Professor Colvin, made in collaboration with E. J. Myers, was an experiment on five hundred and twenty children in public schools and two hundred and seventy-five students of elementary psychology, with the aim of determining the predominant ideational type at different ages. Cards on which were drawn geometrical figures, nonsense characters and nonsense syllables were the material used. Later a story was read to the subjects in which auditory, motor, and visual ideas were artfully combined, in order to determine whether the visually minded would or would not remember more of the visual ideas, the motor minded of the motor ideas, and so on.

The children up to the age of ten were predominantly vizualizers.

In later childhood, auditory imagery—that is, verbal imagery—appeared. Motor imagery, it appears, plays less of a rôle than has generally been supposed. A fairly definite correspondence was established between ideational type and kind of material—visual, auditory, motor, etc.—most readily remembered by each type. Incidentally it was found that the rapid falling off of the memory curve, established by Ebbinghaus and others, did not hold when the test of memory was the amount retained instead of economy in relearning, and when sense instead of nonsense material was used.

In an interesting study on "The Analysis of the Factor of Recall in the Learning Process," Edwina E. Abbott shows that it is better in learning to pause at intervals and try to reproduce, rather than to go on unintermittently jamming the material in. The experiments were made both with nonsense syllables and words, and the subjects were five students from the psychological laboratory. The relative value of "jamming in" and recalling differs with individuals, those having strong "inner-speach" tendencies being more helped by recall than those who depend on reimaging.

Another study by the same author, "On the Analysis of Memory Consciousness in Orthography," establishes certain facts concerning the mental processes of one who learns to spell words. The author found that her four trained subjects invariably substituted visual imagery for the heard letters when the words were spelled out to them, and that the heard letters were never recalled in terms of auditory imagery. Vocalization of the letters when words are presented visually is a hindrance; vocalization of syllables, a help. In general, whatever aids visual presentation, helps along the learning process.

A paper by F. Kuhlmann, on the "Development of Instincts and Habits in Young Birds," gives the results of his observation of young birds in their nests from the time of hatching until they flew away. He recorded their rate of growth in weight, the time of appearance of various motor coordinations and the stages of the appearance of fear. A number of excellent photographs accompany the article.

ABRAM LIPSKY.

NEW YORK.

Über den Austieg der Druckempfindung. G. F. ARPS. Wundt's Psychologische Studien, Bd. IV. (1908). Pp. 431–471.

The article reports a series of experiments carried on in the Leipzig laboratory with the purpose of measuring the period of rise of a pressure sensation, in other words, of determining the relation that exists between the duration of a tactual stimulus and the intensity of the resulting pressure sensation. To this end two stimuli were presented to the subject successively, a normal stimulus of constant weight but variable duration, and a comparison stimulus of constant duration but variable weight. The rise of intensity of the sensation from the standard stimulus was measured by determining for each duration of the standard the weight of the